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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/749,215	12/27/2000	Patrick L. Connor	10599-367001	5294
20985	7590	03/16/2005	EXAMINER	
FISH & RICHARDSON, PC 12390 EL CAMINO REAL SAN DIEGO, CA 92130-2081			NGUYEN, QUANG N	
			ART UNIT	PAPER NUMBER
			2141	

DATE MAILED: 03/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/749,215

Applicant(s)

CONNOR, PATRICK L.

Examiner

Quang N Nguyen

Art Unit

2141

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-8,10-15,17-24 and 26-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-8,10-15,17-24 and 26-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/27/2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Detailed Action***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/08/2004 has been entered.

Claims 1, 15 and 23-24 have been amended. Claims 2, 9, 16 and 25 have been canceled. Claims 1, 3-8, 10-15, 17-24 and 26-35 are presented for examination.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 12, 15, 22 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

4. Claim 12 recites the limitation "The method of **claim 9** ..." in line 1. There is insufficient antecedent basis for this limitation in the claim.

5. Claim 15 recites the limitation "... based on **the length of the package, ...**" in line 11. There is insufficient antecedent basis for this limitation in the claim.
6. Claim 22 recites the limitation "The controller of **claim 16 ...**" in line 1. There is insufficient antecedent basis for this limitation in the claim.
7. Claim 24 recites the limitation "... based on **the length of the package, ...**" in line 10. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. **Claims 1, 3-8, 12, 15, 17-21, 23-24, 26-30 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Kalkunte et al. (5,859,980), herein after referred as Kalkunte.**

10. As per claim 1, Kalkunte teaches a method, comprising:

determining the length of a message received from a sending network (*the buffer management unit 18 retrieves information from header bytes identifying the length of the received packet and passes it to the FIFO control 34*) (C4: L6-11 and L34-37);

comparing a data transmission rate associated with said sending network to a data receiving rate associated with a receiving network (*i.e., comparing the total time to fill the FIFO 32 to the corresponding total time to remove the packet from the FIFO 32 or comparing the arrival rate of bytes into the FIFO 32 for each packet to the corresponding removal rate of bytes from the FIFO 32 for each packet*) (C5: L14-48);

determining an under-run tolerance of the receiving network, the under-run tolerance indicating the extent to which the receiving network will tolerate running out of data during a relay operation (*since the transmit underflow, i.e., under-run, may occur when the data is removed from the transmit FIFO 32 at a rate faster than the rate at which data is transferred into the transmit FIFO 32, the FIFO control 34 determines whether the transmit start point for the packet should be set at the minimum number of bytes, i.e., at the minimum threshold value  $X_m$ , or whether the transmit start point should be adjusted upward or downward to provide an optimal start point for each packet in order to allow minimum transmit underflow, i.e., indicating the extent to which the receiving network will tolerate the underflow*) (C4: L19-58 and C6: L53-58);

if the data transmission rate is less than the data receiving rate (*i.e., if the arrival rate is less than the removal rate*), determining a relay threshold (*i.e., determining a sufficient number of bytes in the FIFO referred to as the transmit threshold  $X_{MTSP}$* ,

*which is adjusted/determined to ensure that underflow does not occur during transmission of the packet)* based on the length of the message, the data transmission rate, the data receiving rate, and the under-run tolerance (C5:L60 – C6:L19); and

initiating relay of said message to a receiving network when a received portion of said message exceeds the relay threshold (*packet transmission is initiated when there are enough bytes in the FIFO, referred to as exceeding the transmit threshold XMTSP*) (C4: L12-30).

11. As per claim 3, Kalkunte further teaches determining a length of said message on the basis of information contained in the header of said message (*the buffer management unit 18 retrieves information from header bytes identifying the length of the received packet and passes it to the FIFO control 34*) (C4: L6-11).

12. As per claim 4, Kalkunte further teaches determining a length of said message on the basis of information obtained as part of a transmission protocol (*since data frame following IEEE 802.3 which specifies that a data frame includes 2 bytes of length information as illustrated in Fig. 4*) (C3: L51-62).

13. As per claims 5-8, Kalkunte further teaches selecting said receiving/sending network to be a network served by a bus or a packet-switched network (*the interface 10 receives data packets from PCI bus 12 for transmission onto the network bus 14*) (C3:L44 – C4:L13).

14. As per claim 12, Kalkunte further teaches evaluating a quantity derived from said data transmission rate and said data receiving rate; and weighting said quantity by said length of said message (*i.e., the total time to fill and remove packets from FIFO are calculated based on the arrival rate and the removal rate of bytes into/from the FIFO queue, multiplied by the length of the packet, the time difference between filling and removing is added to a minimum threshold to create a new adaptive transmit start point*) (C5:L15 – C6:L19).

15. Claims 15, 17-21, 24, 26-30 and 33 are corresponding controller claims and machine-readable medium claims of method claims 1, 3-8 and 12; therefore, they are rejected under the same rationale.

16. Claim 23 is a corresponding system claim of method claims 1 and 3-8; therefore, it is rejected under the same rationale.

### ***Claim Rejections - 35 USC § 103***

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**18. Claims 10 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kalkunte, in view of in view of Dixon et al. (US 4,344,132), herein after referred as Dixon.**

19. As per claims 10 and 31, Kalkunte teaches the claimed invention described above. However, Kalkunte does not explicitly teach determining an effective data transfer rate based on the likelihood that receipt of a message would be interrupted.

In a related art, Dixon teaches determining a likelihood with which receipt of a message from a sending network will be interrupted (*a bus utilization monitor recognizes when a bus is freer, i.e., less interruptions from other devices trying to send data, or not as free, i.e., more interruptions by other devices trying to send data*) (Dixon, C5:L31 – C6:L13); and determining an effective transmission rate on the basis of said likelihood (*multiple devices contending for use of a bus can reduce the effective bus data transfer rate for a given I/O device*) (Dixon, C1: L11-43 and C6: L14-25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the determination of the effective transfer rate of the sending network by determining the likelihood of interruption, as taught by Dixon, in the Kalkunte invention, because knowing this rate would allow the controller of a particular device change the rate the particular device transmits data to be adapted to the current effective transfer rate, reducing the chances for over-runs (*speed control circuitry responsive to the data transfer activity of the data transfer circuitry for causing the*



*device to operate at different speeds for different values of bus availability*) (Dixon, C1: L11-43 and C5:L31 – C6:L13).

**20. Claims 11 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kalkunte, in view of Dixon, and further in view of Haumont et al. (US 2004/0071086), herein after referred as Haumont.**

21. As per claims 11 and 32, Kalkunte-Dixon teaches the method of claim 1, but does not explicitly teach determining the likelihood of interruption based on an analysis of statistics of the usage of said networks.

In a related art, Haumont teaches analyzing statistics on usage of a sending network and/or receiving network (*monitoring the network traffic congestion and formulating history of congestion risks*) (Haumont, Abstract, page 6, paragraph 0070).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the analysis of statistical information regarding the congestion (interruptions) of networks, as taught by Haumont, when determining the effective bandwidth in the modified Kalkunte invention because statistical analysis would allow the controller to analyze the historical patterns of congestions and categorize them accordingly, as taught by Haumont (page 6, paragraph 0070), allowing the controller to make decisions based on what category of congestion it is expecting.

**22. Claims 13 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kalkunte.**

23. As per claims 13 and 34, Kalkunte further teaches said receiving network including a bus having a bus width (the buses in Kalkunte inherently have a bus width).

However, Kalkunte does not explicitly teach constraining said relay threshold to be a multiple of said bus width. "Official Notice" is taken that both the concept and advantages of having the relay threshold be a multiple of the bus width of the receiving network are well known and expected in the art.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to constrain the thresholds taught in Kalkunte to be a multiple of the bus width of the receiving network because otherwise, when a threshold was reached and data transferred, some bus transactions would contain fewer bits than the size of the bus, making the costly overhead of the bus transaction cost even more per bit, thus reducing communication efficiency.

**24. Claims 14, 22 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kalkunte, in view of in view of Kuo et al. (US 6,105,079), herein after referred as Kuo.**

25. As per claims 14, 22 and 35, Kalkunte teaches the method of claim 1, but does not explicitly teach obtaining said relay threshold from a look-up table.

In a related art, Kuo teaches obtaining said relay threshold from a look-up table on the basis of a message length (*select between stored thresholds based on the long bit; wherein the long bit was previously taught to be derived by the length of the data frame*) (Kuo, C10: L3-5).

Therefore, it would have been obvious to one having ordinary skills in the art at the time the invention was made to combine the teachings of Kalkunte and Kuo to obtain the relay threshold from a look-up table since such methods were conventionally employed in the art to reserve/store the relay threshold (*the information that would be often used or reused again and again for a specific pair of sending and receiving network devices or for optimizing a particular long/short frames*) of a specific pair of sending and receiving network devices for easy and quick access.

### ***Response to Arguments***

26. In the remarks, applicant argued in substance that,

(A) Prior Art fails to disclose or to suggest, “determining an under-run tolerance of the receiving network, the under-run tolerance indicating the extent to which the receiving network will tolerate running out of data during a relay operation”.

As to point (A), **Kalkunte** teaches since the transmit underflow (*i.e., under-run*) may occur when the data is removed from the transmit FIFO 32 at a rate faster than the

rate at which data is transferred into the transmit FIFO 32, the FIFO control 34 determines whether the transmit start point for the packet should be set at the minimum number of bytes (*i.e., at the minimum threshold value  $X_m$* ), or whether the transmit start point should be adjusted (*e.g., either upward or downward*) to provide an optimal start point for each packet in order to allow minimum transmit underflow (*i.e., to indicate the extent to which the receiving network will tolerate the underflow*) (**Kalkunte, C4: L19-58 and C6: L53-58**).

(B) Prior Art fails to disclose or to suggest, “determining a relay threshold based, in part, on the under-run tolerance”.

As to point (B), **Kalkunte** teaches the FIFO control 34 determines whether the transmit start point for the packet should be set at the minimum number of bytes (*i.e., at the minimum threshold value  $X_m$* ), or whether the transmit start point should be adjusted (*e.g., either upward or downward*) to provide an optimal start point for each packet in order to allow minimum transmit underflow (*i.e., to determine a relay threshold based, in part, on the under-run tolerance*) (**Kalkunte, C4: L19-58 and C6: L53-58**).

27. Applicant’s arguments as well as request for reconsideration filed on 11/08/2004 have been fully considered but they are not deemed to be persuasive.

28. A shortened statutory period for reply to this action is set to expire THREE (3) months from the mailing date of this communication. See 37 CFR 1.134.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang N. Nguyen whose telephone number is (571) 272-3886.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's SPE, Rupal Dharia, can be reached at (571) 272-3880. The fax phone number for the organization is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
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